Claim 1. (canceled)

Claim 2. (previously presented) A shutter switch for an electromagnetic wave beam, comprising:

a plurality of waveguides adapted to receive at least part of an electromagnetic beam, said waveguides being adjacent to one another with their longitudinal axes aligned with the propagation of said beam, said waveguides switchable to either transmit or block transmission of their respective portions of said beam, wherein each of said waveguides comprises:

four wall inside surfaces comprising two opposing sidewalls and a top and bottom wall;

respective high impedance wall structures on at least two opposing walls, said wall structures presenting a high surface impedance to E fields transverse to the waveguide axis and tangential to the said opposing wall structure, and a low impedance to E fields parallel to the waveguide axis; and

shorting arrangements on each said wall structures to short circuit their high impedances;

each of said waveguides having internal dimensions to cut-off the transmission of its respective portion of said beam when its high impedance wall structure is short circuited to a low impedance state.

Claim 3. (previously presented) The shutter switch of claim 2, wherein each said high impedance wall structure comprises:

a sheet of dielectric material having two sides;

a conductive layer on one outer side of said dielectric material;

a plurality of mutually spaced conductive strips on the other inner side of said dielectric material, said strips having gaps between adjacent said strips and being aligned parallel to the guide longitudinal axis; and

a plurality of conductive vias extending through said dielectric material between said conductive layer and said conductive strips.

Claim 4. (original) The shutter switch of claim 3, wherein said conductive strips have a uniform width and are disposed with a uniform gap between adjacent strips.

Claim 5. (previously presented) The shutter switch of claim 3, wherein adjacent pairs of said strips present a capacitance and said dielectric sheet presents an inductance to an electromagnetic beam with an E field transverse and tangential to said conductive strips.

Claim 6. (previously presented) The shutter switch of claim 5, wherein said conductive strips and dielectric material present a series connection of parallel L-C circuits, resonant at an operating frequency, to an electromagnetic beam with an E field transverse and tangential to said conductive strips.

Claim 7. (original) The shutter switch of claim 3, wherein said sheet of dielectric material comprises plastic, poly-vinyl carbonate (PVC), ceramic or high resistant semiconductor material.

Claim 8. (previously presented) The shutter switch of

claim 3, wherein said high impedance structure are provided on said waveguide's sidewalls and present a high impedance to the E field component of a vertically polarized guided beam.

Claim 9. (previously presented) The shutter switch of claim 3, wherein said high impedance structure are provided on said waveguide's top and bottom walls and present a high impedance to the E field component of a horizontally polarized guided beam.

Claim 10. (previously presented) The shutter switch of claim 3, wherein said high impedance structure are provided on said waveguide's sidewalls and top and bottom walls and present a high impedance to the E field component of both vertically and horizontally polarized beams.

Claim 11. (previously presented) The shutter switch of claim 3, wherein said shorting arrangements change said high surface impedance structure to a conductive surface by shorting said gaps between said conductive strips.

Claim 12. (previously presented) The shutter switch of claim 11, wherein said shorting arrangements comprise micro electromechanical systems (MEMS) switches.

Claim 13. (previously presented) The shutter switch of claim 12, wherein each of said MEMS shorting arrangements comprises a shorting strip suspended over said gap between a respective pair of said conductive strips, said gap being shorted by applying a voltage potential to adjacent

electrodes creating an electrostatic tension that pulls said shorting strip down to said conductive strips to form a conductive bridge across said gap between said conductive strips.

Claim 14. (previously presented) The shutter switch of claim 11, wherein said shorting comprise varactor diode in each of said gaps.

Claim 15. (previously presented) The shutter switch of claim 14, wherein each of said varactor diode places a variable capacitance across its respective said gap such that a voltage may be applied to detune the parallel L-C circuits away from said operating frequency thus rendering the high surface impedance to a low impedance state and causing a cut-off state for said guide at said operating frequency.

Claim 16. (previously presented) The shutter switch of claim 2, wherein said high impedance wall structure comprises:

a plurality of stacked high impedance layers, each presenting a high impedance surface to the E field component of a different respective electromagnetic beam operating frequency and being transparent to the E fields of lower operating frequency signals, and presenting a low impedance surface to the E field of higher operating frequency signals; and

the bottommost said layer presenting a high impedance surface to the E field of the lowest frequency of said operating signals, and each succeeding layer presenting a

high impedance surface to the E field of successively higher operating frequencies.

Claim 17. (original) The shutter switch of claim 16, wherein each of said high impedance layers comprises a substrate of dielectric material having a top and bottom surface and a plurality of conductive strips on said substrate's top surface with gaps between adjacent conductive strips, and further comprising a conductive layer on the bottom surface of the bottommost layer's dielectric substrate.

Claim 18. (previously presented) The shutter switch of claim 16, wherein corresponding conductive strips of said high impedance layers are aligned along the guide longitudinal axis and said high impedance layers further comprise conductive vias through said dielectric substrates between said aligned conductive strips and said conductive layer.

Claim 19. (original) The shutter switch of claim 16, wherein said conductive strips on each said layers have uniform widths and uniform gaps between adjacent strips.

Claim 20. (previously presented) The shutter switch of claim 16, wherein each of said high impedance layers presents a series connection of resonant parallel L-C circuits to the E field of its respective operating frequency.

Claim 21. (original) The shutter switch of claim 16,

wherein the widths of said strips decreases and the width of said gaps between adjacent conductive strips increases with succeeding high impedance layers from the bottommost layer to the topmost.

Claim 22. (previously presented) The shutter switch of claim 16, wherein said high surface impedance wall structures are on said waveguide's sidewalls and present a high impedance to the E field component of said different frequency beams having vertical polarization.

Claim 23. (previously presented) The shutter switch of claim 16, wherein said high impedance wall structures are on said waveguide's top and bottom walls and present a high impedance to the E field component of said different frequency beams having horizontal polarization.

Claim 24. (previously presented) The shutter switch of claim 16, wherein said high impedance structures are on said waveguide's sidewalls and top and bottom walls and present a high impedance to the E field component of said different frequency beams having both vertical and horizontal polarization.

Claim 25. (previously presented) The shutter switch of claim 17, further comprising shorting arrangements on each of said plurality of layers to change said high surface impedances to a conductive surfaces by shorting said gaps between said conductive strips.

Claim 26. (previously presented) The shutter switch of

claim 25, wherein said shorting arrangements comprises micro electromechanical systems (MEMS) switches.

Claim 27. (previously presented) The shutter switch of claim 26, wherein each of said MEMS switches comprises a shorting strip suspended over said gap between a respective pair of said conductive strips, said switch being closed by applying a voltage potential to adjacent electrodes creating an electrostatic tension that pulls said shorting strip down to said conductive strips to form a conductive bridge across said gap between said conductive strips.

Claim 28. (previously presented) The shutter switch of claim 25, wherein said shorting switches comprise varactor diode in each of said gaps.

Claim 29. (previously presented) The shutter switch of claim 28, wherein each of said varactor diode places a variable capacitance across its respective said gap such that a voltage may be applied to detune the parallel L-C circuits away from said operating frequency thus rendering said high surface impedance to a low impedance state.

Claim 30. (previously presented) The shutter switch of claim 28, wherein said shorting arrangements are closed on selective layers of said high impedance structures to block transmission of one or both polarities of said beam at one or all of said different frequency signals.

Claims 31 and 32. (canceled)

Claim 33. (previously presented) A millimeter beam transmission system, comprising;

an electromagnetic beam transmitter;

an electromagnetic beam receiver;

a shutter switch positioned in the path of said beam between said transmitter and receiver, said shutter switch comprising at least one waveguide positioned to receive at least part of said beam, the longitudinal axis of each if said waveguides aligned with the propagation of said beam, each of said waveguide being switchable to either transmit or block transmission of its respective portion of said beam, wherein each said waveguide comprises:

four wall inner surfaces comprising, two opposing sidewalls and a top and bottom wall;

a high impedance wall structure on at least two opposing walls of said waveguide, said wall structure presenting a high surface impedance to E fields transverse to the waveguide axis and tangential to the wall structure, and a low impedance to E fields parallel to the waveguide axis; and

shorting arrangements on each said high impedance structure to change the high surface impedance of said structure to a low impedance surface.

Claim 34. (previously presented) The system of claim 33, wherein each said waveguide has inner dimensions such that the transmission of said electromagnetic beam is cut-off when said waveguide sidewalls and top and bottom walls are low impedance surfaces.

Claim 35. (previously presented) The system of claim 33,

wherein each said high impedance wall structure comprises:

a sheet of dielectric material having two sides;

a conductive layer on one outer side of said dielectric material;

a plurality of mutually spaced parallel conductive strips on the other inner side of said dielectric material; and

a plurality of conductive vias extending through said dielectric material between said conductive layer and said conductive strips.

Claim 36. (original) The system of claim 35, wherein said conductive strips have a uniform width, are disposed with a uniform gap between adjacent strips and are parallel to the longitudinal axis of their respective said waveguide.

Claim 37. (previously presented) The system of claim 36, wherein said conductive strips, vias and dielectric material present a series connection of parallel L-C circuits to an electromagnetic wave with an E field transverse and tangential to said conductive strips.

Claim 38. (previously presented) The system of claim 36, wherein said shorting arrangements change said high surface impedance structure to a low impedance surface by shorting said gaps between said conductive strips.

Claim 39. (previously presented) The system of claim 33, wherein said high impedance wall structure comprises:

a plurality of stacked high surface impedance layers, each presenting a high surface impedance to the E field

component of a different respective electromagnetic beam operating frequency and being transparent to the E fields of lower frequency signals, and presenting a low impedance surface to the E field of higher frequency signals; and

the bottommost said layer presenting a high surface impedance to the E field of the lowest frequency of said signals, and each succeeding layer presenting a high surface impedance to the E field of successively higher frequencies.

Claim 40. (previously presented) The system of claim 39, wherein each said layer presents a series connection of resonant parallel L-C circuits to the E field of its respective signal operating frequency.

Claim 41. (original) The system of claim 39, wherein each of said high impedance layers comprises a substrate of dielectric material having a top and bottom surface and a plurality of conductive strips on said substrate's top surface, and further comprising a conductive layer on the bottom surface of the bottommost layer's dielectric substrate.

Claim 42. (previously presented) The system of claim 39, wherein corresponding conductive strips of said layers are aligned along longitudinal axis of said guide and said high impedance structure further comprises conductive vias through said dielectric substrates between said aligned conductive strips and said conductive layer.

Claim 43. (previously presented) The system of claim 39,

wherein said shorting arrangements change said high surface impedance structure to a low impedance surface by shorting said gaps between said conductive strips.

Claim 44. (previously presented) The system of claim 33, wherein said high impedance structure are provided on said waveguide's sidewalls and present a high impedance to a transverse and tangential E field component of vertically polarized beams at one or more operating frequencies.

Claim 45. (previously presented) The system of claim 33, wherein said high impedance structure are provided on said waveguide's top and bottom walls such that said high impedance structure presents a high surface impedance to an E field component of a horizontally polarized beams at one or more operating frequencies.

Claim 46. (previously presented) The system of claim 33, wherein said high impedance structures are provide on said waveguide's sidewalls and top and bottom walls and present a high impedance to the E transverse and tangential field components of a vertically and horizontally polarized beams at one or more operating frequencies.

Claim 47. (previously presented) The system of claim 46, wherein said shorting arrangements are closed on selective layers of said high impedance structures to block transmission one or both polarities of said beam at one or all of said different operating frequency signals.

Claims 48-52. (canceled)